# C L A I M S

1. A cyclonic fluid separator for separating condensable, liquid and/or solid components from a fluid mixture, the separator comprising an upstream fluid inlet section in which the fluid mixture is accelerated to a near sonic or supersonic velocity to expand and cool the fluid mixture such that one or more condensable fluid components are liquefied and/or solidified, a downstream separation section in which condensables depleted and condensables enriched fluid fractions are separated and fed into separate outlets , and a tubular midstream vortex generation section comprising a plurality of tilted wings having wing tips that are located at a spacing S less than 0.2 W from the inner surface of the tubular midstream vortex generation section , which has an internal width W in the region of the wing tips.

2. The cyclonic fluid separator of claim 1, wherein the separator is designed to be fed with a fluid stream containing liquid and/or solid particles and to accelerate and cool the fluid stream to near sonic or supersonic velocities in the tubular midstream section and to remove the cooled particles from the fluid stream in a downstream separation section.

3. The cyclonic fluid separator of claim 1, wherein the wing tips are located in a rotational symmetrical configuration relative to a central axis of the tubular midstream vortex generation section.

4. The cyclonic fluid separator of claim 2, wherein a pair of tilted delta-shaped wings protrude from the inner surface of the tubular midstream vortex generation

section in a rotational symmetrical configuration relative to the central axis of the tubular midstream vortex generation section and such that the wing tips are located at substantially diametrically opposite locations relative to said central axis.

5. The cyclonic fluid separator of claim 3, wherein the distance (D) between the wing tips is between 0.6W and 0.99W, more particularly between 0.8W and 0.98W.

6. The cyclonic fluid separator of claim 2, wherein three tilted delta shaped wings protrude from the inner surface of the tubular midstream vortex generation section in a rotational symmetrical configuration relative to the central axis of the tubular midstream vortex generation section and such that the wing tips are located at angular intervals of substantially 120 degrees relative to said central axis.

7. The cyclonic fluid separator of claim 1, wherein at least two delta-shaped wings are mounted at regular angular intervals on an elongate wing carrier body which is substantially co-axial to the central axis of the tubular midstream vortex generation section.

8. The cyclonic fluid separator of claim 2, wherein a corrugated tubular vortex finder is arranged within the separation section of the separator and a condensables depleted fluid outlet is connected to the interior of the vortex finder and a condensables enriched fluid outlet is connected to an annular space between the outer surface of the tubular vortex finder and the inner wall of the separation section of the separator.

9. The cyclonic fluid separator of claim 7, wherein the orientation of the corrugated tubular vortex finder is adaptable relative to the central axis of the tubular midstream section of the separator.

10. The cyclonic fluid separator of any preceding claim, wherein the wing carrier body extends through a throat section in the tubular inlet section of the separator and comprises in the region of a throat portion of the nozzle a profiled section having a larger cross-axial surface than the section of the carrier body on which the wings are mounted.

11. The cyclonic fluid separator of claim 6, wherein the wing carrier body is rotatably mounted within the tubular midstream section of the separator.